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THE DESTRUCTION OF BIRDS AT THE LIGHTHOUSES ON THE COAST OF CALIFORNIA

By WALTER ALBION SQUIRES and HAROLD E. HANSON

WITH TWO PHOTOS AND MAP

(Contribution from the Audubon Association of the Pacific)

FROM time to time we hear accounts of the destruction of migrating birds at government lighthouses. Such rumors concerning the destruction of birds on the California coast reached the Audubon Association of the Pacific last spring, and led C. B. Lastreto, president of the Association, to undertake a systematic investigation. The data obtained was turned over to the two authors of the present paper, forming the basis of the report which they herewith present. Mr. Lastreto was fortunate enough to secure the cooperation of Captain R. N. Rhodes, lighthouse inspector for the district covering California. The following questionnaire was prepared by the Association and sent out under the supervision of Captain Rhodes.

1. Give such estimates as you can concerning the number of birds found dead about your lighthouse.
2. At what season of the year is such mortality greatest?
3. During what kind of weather does mortality seem to be greatest?
4. Are there more dead birds on one particular side of the lighthouse than on the other sides?
5. Does the destruction of the birds seem to you to be due to their flying violently against the glass, or do they become confused and fly around and against the glass until they become exhausted and fall to the earth?
6. Have you noted any injury in such birds as you have picked up about your lighthouse?
7. Is there a railing around your lighthouse, or any other support on which birds might perch?
8. Name as many birds as you can which have been found dead at your lighthouse.
9. Give location of your lighthouse; is it on an island or on the mainland; at what elevation is it?
10. Is the number of birds killed at lighthouse stations increasing or is it decreasing, in your opinion?

Thirty-seven letters were received in answer to the above questions. A study of the contents of these letters points to the following conclusions.

I. The destruction of birds at the lighthouses of the California coast is slight. Only ten of the stations reporting tell of any destruction at all, and at some of these ten the number of birds killed is very small. Many keepers, including one who has been at the same lighthouse forty years, state positively that no birds are ever killed at their station. It is of course possible that birds are killed at some stations and escape notice, but this could hardly be the case if they were destroyed in any considerable numbers, and, moreover, careful count has apparently been made at several of the lighthouses of all birds found dead. One keeper reports ninety-one birds killed in three years, another four birds in three years.

At two or three stations the destruction is evidently more serious.

The keeper at the Point Arena light states that after "calm dark nights" from ten to thirty birds are found dead at his lighthouse. Another says that at his station the average is about six a night; still another reports an average

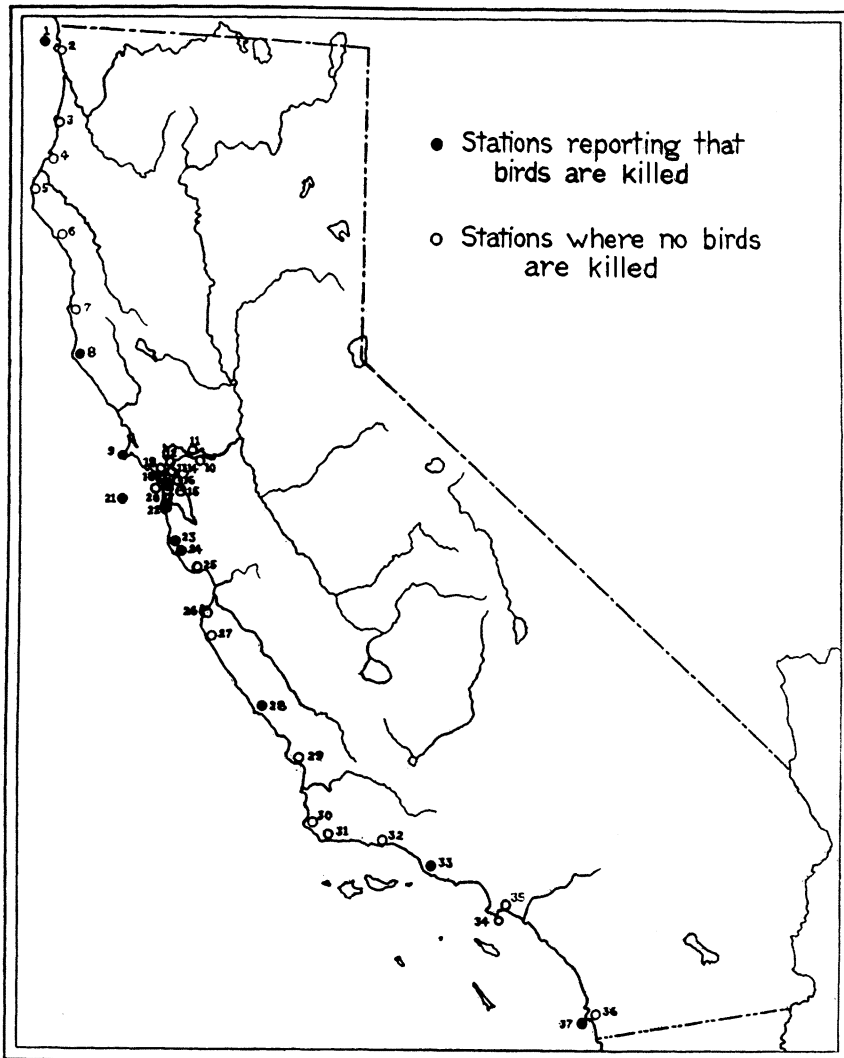


Fig. 1. Map of California, showing the location of lighthouses. Following is a list of those from which reports were received, named from north to south.

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|--------------------------|--------------------------|-------------------------|
| 1. St. George's Reef. | 14. Angel Island. | 26. Point Pinos. |
| 2. Crescent City. | 15. Oakland Harbor. | 27. Point Sur. |
| 3. Trinidad Head. | 16. Goat Island. | 28. Piedras Blancas. |
| 4. Table Bluff. | 17. Fort Point. | 29. San Luis Obispo. |
| 5. Cape Mendocino. | 18. Lime Point. | 30. Point Arguello. |
| 6. Punta Gorda. | 19. Point Bonita. | 31. Point Concepcion. |
| 7. Point Cabrillo. | 20. Mile Rock. | 32. Santa Barbara. |
| 8. Point Arena. | 21. South East Farallon. | 33. Point Hueneme. |
| 9. Point Reyes. | 22. Point Montara. | 34. Point Firmin. |
| 10. Roe Island. | 23. Pigeon Point. | 35. Los Angeles Harbor. |
| 11. Carquinez Strait. | 24. Ano Nuevo Island. | 36. Ballast Point. |
| 12. East Brother Island. | 25. Santa Cruz. | 37. Point Loma. |
| 13. Southampton Shoal. | | |

of twelve a night in the migration season. The birds killed at these lighthouses would probably amount to quite a large number from year to year. But when we remember that there are twenty-seven other stations reporting no destruction at all, we see that the number of birds killed in this way on the whole coast must be comparatively slight.

II. The destruction of birds at the lighthouses of the California coast is confined almost entirely to water fowl and shore birds. Only two stations report any land birds destroyed. Following is a list of the birds reported as having been found dead about the lighthouse stations:

Name of bird as reported.	Number of times reported.
1. "Small land birds"	2
2. "Small sea birds" (possibly petrels)	3
3. "Snipe" (probably some species of sandpiper)	2
4. "Coot"	1
5. "Shag" (cormorant)	1
6. "Divers" (loons and grebes)	2
7. "Ducks"	5
8. "Spoonbill Duck"	1
9. "Teal"	1
10. "Wild Goose"	1
11. "Curlew"	2
12. "Sandpiper"	1
13. "Grey Shore Bird"	2

The evidently small number of land birds killed at the lighthouses of the coast is surprising, since we have been accustomed to think of them as perishing in great numbers at similar places in Europe, in the Great Lakes region, and on the Atlantic coast. It may be that the number so killed in the regions named has been overestimated, if, indeed, any careful and extensive study of the matter has been made. But, making all such allowances, it seems probable that the number of birds killed on this coast is far below the usual quota elsewhere. The writers suggest the following reasons as offering a plausible explanation of the difference.

1. The character of bird migration on the Pacific Coast. It is a well known fact that western birds do not migrate with that concentrated wave movement common among the birds of our Eastern and Middle states. In that region we awake some fine spring morning to find forest and garden and wayside weeds melodious with song where all was wintry silence but yesterday. This does not happen in California. Migrations here are more leisurely and widespread, hence less dangerous to the bird travellers.

2. The character of the California coast. A glance at the map will show that the portion of the North American coast comprised within the boundaries of California pushes out westward into the Pacific Ocean in one vast convexity. Birds travelling on this coast and taking "short cuts" will be thrown away from the ocean. On the other hand the Atlantic coast of our country consists of three great concavities and many lesser indentations of the sea. Birds travelling on the Atlantic coast have numerous sea trips, more or less extended, and will consequently be continually passing near lighthouse stations.

3. The structure and location of California lighthouses. The senior author has seen over half of the thirty-six lighthouses from which reports have been received, and can say that for the most part they are comparatively low structures. The tall, brick-chimney type of lighthouse which one sees so often on the Great Lakes seems to be almost wholly wanting on this coast.

The returns seem to indicate that the danger to birds increases in direct proportion to the distance of the lighthouse lantern above the ground, while the general elevation of the whole structure is also an important factor. Many of the lighthouses are situated near sea level and at the foot of high bluffs, and not one so situated reports any bird destruction. But where the lighthouse is located on a height, even though it be not very high itself, there is considerable



Fig. 2. Lighthouse at Point Arena, Mendocino County, California. The "brick chimney" type, whose great height makes it dangerous to birds. The light at this station is 155 feet above the sea, and the keeper reports from ten to thirty birds per night killed on calm, dark nights during the migration seasons.

Courtesy of the Lighthouse Service, U. S. Dept. Commerce.

mortality. This is indicated by the fact that the average elevation of all the lighthouses reporting birds killed is 165 feet, while the average elevation of all the lighthouses reporting no birds killed is only eighty-eight feet.

III. The larger birds are killed by flying violently against the glass or other portions of the lighthouse structure; small birds are also sometimes killed in this way, but sometimes also they become confused, and fly about and

against the lantern until they fall from exhaustion. A number of correspondents speak of finding birds with necks broken and breast bones crushed, showing that they had struck some solid object with great violence. It is quite evident that the placing of perches on most of the lighthouses of this coast would be time and money wasted. Not many birds are killed at most of them and the birds killed are not perching birds for the most part.

IV. The greatest danger to the birds is evidently on dark overcast nights. The seasons of greatest danger are evidently during the spring migration and the autumnal migration, with less danger during the winter season and least of



Fig. 3. Lighthouse at Hueneme, Ventura County, California. The low-built type of lighthouse which causes but slight destruction of birds, this particular station reporting only four birds found dead in three years.

Courtesy of the Lighthouse Service, U. S. Dept. Commerce.

all in summer. There is considerable difference of opinion as to the time of greatest mortality but on the whole the statement above seems to be in accord with the majority of the correspondents.

V. In the opinion of the lighthouse keepers the destruction of birds at the lighthouse stations is not increasing. Seventy-five percent of those answering the question think the number of birds killed is growing less; the others think there is no noticeable change.

San Francisco, California, November 2, 1917.